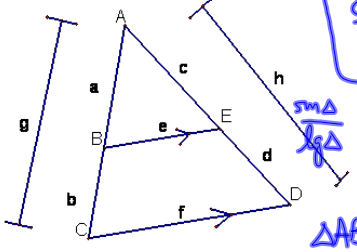
6.6 Using Proportionality Theorems

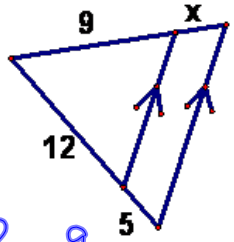
Theorem 6.4-Triangle Proportionality Theorem ~~If~~ a line is parallel to one side of a triangle and intersects the other two sides, then it divides the two sides proportionally.



$\frac{a}{b} = \frac{c}{d}$

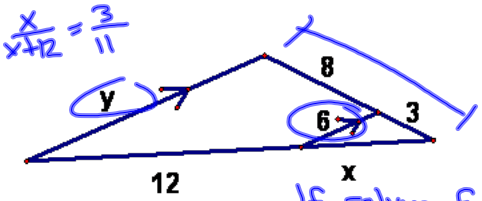
sm△ / lg△ $\frac{a}{g} = \frac{e}{f} = \frac{c}{h}$

△ABE ~ △ACD



$\frac{12}{5} = \frac{9}{x}$

$x = 3.75$



$\frac{x}{x+12} = \frac{3}{11}$

$\frac{x}{12} = \frac{3}{8}$

$x = 4.5$

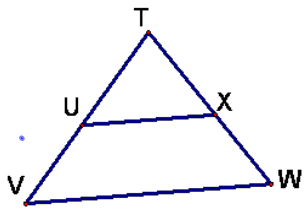
If solving for //-sides you must use whole △s

$\frac{6}{y} = \frac{3}{11}$

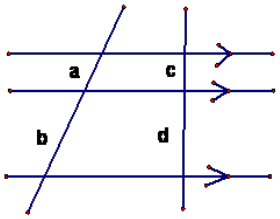
Theorem 6.5-Converse of the triangle proportionality Theorem
If a line intersects two sides of a triangle proportionally, then the line is parallel to the third side.

If $\frac{TU}{UV} = \frac{TX}{XW}$

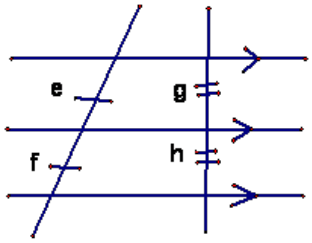
then $\overline{UX} \parallel \overline{VW}$



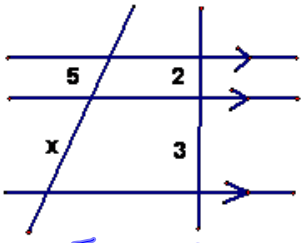
Theorem 6.6-If three or more parallel lines intersect two transversals,
then they divide the transversals proportionally



$\frac{a}{b} = \frac{c}{d}$

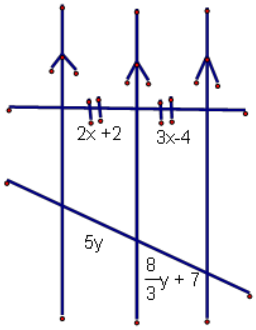


$\frac{e}{f} = \frac{g}{h}$



$\frac{5}{x} = \frac{2}{3}$

$x = 7.5$



$2x+2 = 3x-4$

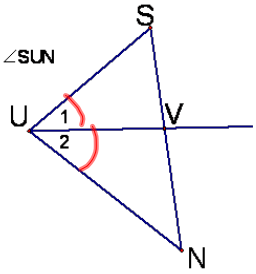
$x = 6$

$5y = \frac{8}{3}y + 7$

$\frac{7}{3}y = 7$

$y = 3$

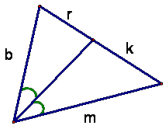
Theorem 6.7 If a ray bisects an angle in a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.

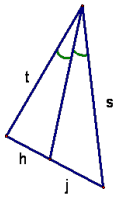


$\triangle SUN$
$\overrightarrow{UV}$ bisects $\angle SUN$

$\frac{SV}{SU} = \frac{VN}{UN}$

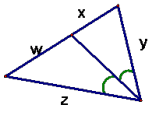
$\frac{SV}{VN} = \frac{SU}{UN}$



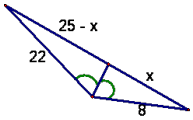


$\frac{b}{r} = \frac{k}{m}$

$\frac{t}{h} = \frac{s}{j}$



$\frac{w}{x} = \frac{z}{y}$



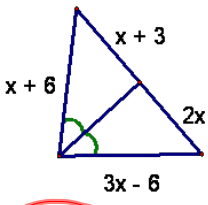
$\frac{x}{25-x} = \frac{8}{22}\ \frac{4}{11}$

$11x = 4(25-x)$

$100-4x$

$15x = 100$

$x = 6\frac{2}{3}$



$\frac{(x+3)}{(2x+1)} = \frac{(x+6)}{(3x-6)}$

$(x+3)(3x-6) = (x+6)(2x+1)$

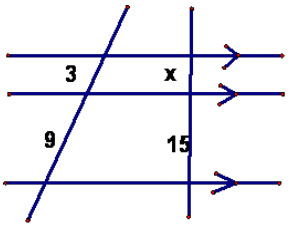
$3x^2 + 3x - 18 = 2x^2 + 13x + 6$

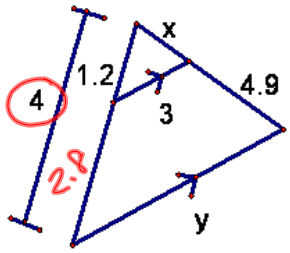
$x^2 - 10x - 24 = 0$

$(x+2)(x-12)$

$x = -2$ $x = 12$

$x = 12$





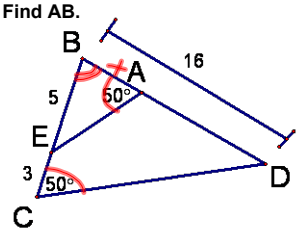
$\frac{x}{4.9} = \frac{1.2}{2.8}$

$x = 2.1$

$\frac{1.2}{4} = \frac{3}{y}$

$y = 10$

Find AB.



$\triangle ABE \sim \triangle CBD$

$\frac{AB}{CB} = \frac{BE}{BD}$

$\frac{x}{8} = \frac{5}{16}$ $x = 2.5$

HW p400-401 #s 3-11, 16